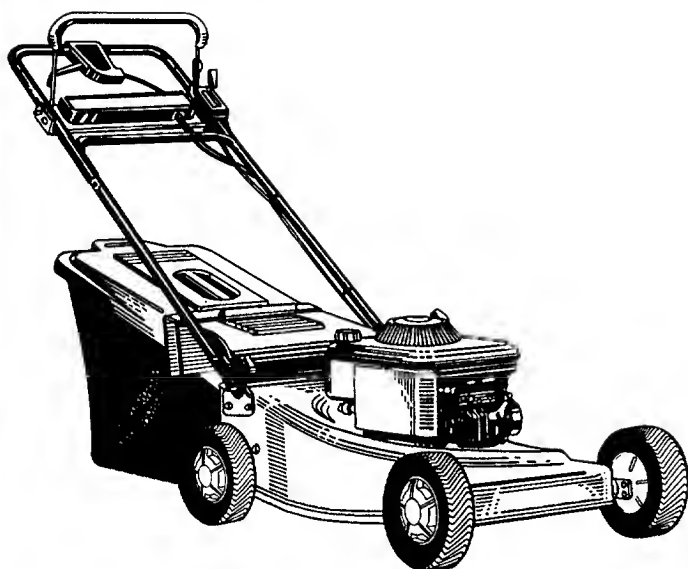


OWNER'S GUIDE

ASSEMBLY • OPERATION • MAINTENANCE • PARTS



21" ELECTRIC START ROTARY MOWERS

Model Numbers
121-476E000
121-478E000

→ IMPORTANT

The battery pack is shipped in a partially charged state and must be charged 16 hours prior to initial use. Follow charging instructions on page 10.

Important: Read Safety Rules and Instructions Carefully



WARNING: This unit is equipped with an internal combustion engine and should not be used on or near any unimproved forest-covered, brush-covered or grass-covered land unless the engine's exhaust system is equipped with a spark arrester meeting applicable local or state laws (if any). If a spark arrester is used, it should be maintained in effective working order by the operator.

In the State of California the above is required by law (Section 4442 of the California Public Resources Code). Other states may have similar laws. Federal laws apply on federal lands. A spark arrester for the muffler is available through your nearest engine authorized service dealer or contact the service department, P.O. Box 360900, Cleveland, Ohio 44136.

IMPORTANT

RULES FOR SAFE OPERATION



THIS SYMBOL POINTS OUT IMPORTANT SAFETY INSTRUCTIONS WHICH, IF NOT FOLLOWED, COULD ENDANGER THE PERSONAL SAFETY AND/OR PROPERTY OF YOURSELF AND OTHERS. READ AND FOLLOW ALL INSTRUCTIONS IN THIS MANUAL BEFORE ATTEMPTING TO OPERATE YOUR LAWN MOWER. FAILURE TO COMPLY WITH THESE INSTRUCTIONS MAY RESULT IN PERSONAL INJURY. WHEN YOU SEE THIS SYMBOL—



HEED ITS WARNING.



DANGER:

Your lawn mower was built to be operated according to the rules for safe operation in this manual. As with any type of power equipment, carelessness or error on the part of the operator can result in serious injury. If you violate any of these rules, you may cause serious injury to yourself or others.



TRAINING

1. Read this owner's guide carefully in its entirety before attempting to assemble or operate this machine. Be completely familiar with the controls and the proper use of this machine before operating it. Keep this manual in a safe place for future and regular reference and for ordering replacement parts.
2. Your rotary mower is a precision piece of power equipment, not a plaything. Therefore, exercise extreme caution at all times. Your unit has been designed to perform one job: to mow grass. Do not use it for any other purpose.
3. Never allow children under 14 years old to operate a power mower. Children 14 years old and over should only operate mower under close parental supervision. Only persons well acquainted with these rules of safe operation should be allowed to use your mower.
4. Keep the area of operation clear of all persons, particularly small children and pets. Stop engine when they are in the vicinity of your mower to help prevent blade contact or throw object injury. Although the area of operation should be completely cleared of foreign objects, an object may have been overlooked and could be accidentally thrown by the mower in any direction and cause serious personal injury to the operator or any other allowed in the area.



PREPARATION

1. Thoroughly inspect the area where the equipment is to be used. Remove all stones, sticks, wire, bones and other foreign objects which could be picked up and thrown by the mower in any direction and cause serious personal injury to the operator or any others allowed in the area. Plan your mowing pattern to avoid discharge of material toward roads, sidewalks, bystanders and the like.
2. Always wear safety glasses or eye shields during operation or while performing an adjustment or repair, to protect eyes from foreign objects that may be thrown from the machine in any direction.
3. Wear sturdy, rough-soled work shoes and close-fitting slacks and shirts. Shirts and pants that cover the arms and legs and steel-toed shoes are recommended. Do not wear loose fitting clothes or jewelry. They can be caught in moving parts. Never operate a unit in bare feet, sandals, or sneakers.
4. Before working with gasoline, extinguish all cigarettes, cigars, pipes and other sources of ignition. Check the fuel level before starting the engine. Gasoline is an extremely flammable fuel. Do not fill the gasoline tank indoors, while the engine is running, or until engine has been allowed to cool for at least two minutes after running. Replace gasoline cap securely and wipe off any spilled gasoline before starting the engine as it may cause a fire or explosion.
5. Disengage the self-propelled mechanism or drive clutch on units so equipped before starting the engine.
6. The blade control handle is a safety device. Never attempt to bypass its operation. Doing so makes the safety device inoperative and may result in personal injury through contact with the rotating blade. The blade control handle must operate easily in both directions and automatically return to the disengaged position when released.
7. Never attempt to make a wheel or cutting height adjustment while the engine is running.
8. Never operate the mower in wet grass. Always be sure of your footing. A slip and fall can cause serious personal injury. Keep a firm hold on the handle and walk, never run. Mow only in daylight or in good artificial light.



OPERATION

9. For your safety, use the slope gauge included as part of this manual to measure slopes before operating this unit on a sloped or hilly area. If the slope is greater than 15° as shown on the slope gauge, do not operate this unit on that area or serious injury could result.
1. Do not change the engine governor settings or overspeed the engine. Excessive engine speeds are dangerous.
2. Do not put hands or feet near or under rotating parts. Keep clear of the discharge opening at all times as the rotating blade can cause injury.
3. Stop the blade when crossing gravel drives, walks or roads.
4. After striking a foreign object, stop the engine, remove the wire from the spark plug, and thoroughly inspect the mower for any damage. Repair the damage before restarting and operating the mower.
5. If the equipment should start to vibrate abnormally, stop the engine and check immediately for the cause. Vibration is generally a warning of trouble.
6. Shut the engine off and wait until the blade comes to a complete stop before removing the grass catcher or unclogging the chute. The cutting blade continues to rotate for a few seconds after the engine is shut off. Never place any part of the body in the blade area until you are sure the blade has stopped rotating.
7. Before cleaning, repairing or inspecting, make certain the blade and all moving parts have stopped. Disconnect the spark plug wire, and keep the wire away from the spark plug to prevent accidental starting.
8. Do not run the engine indoors.
9. Never cut grass by pulling mower toward you. Mow across the face of slopes, never up-and-down. Exercise extreme caution when changing direction on slopes. Do not mow excessively steep slopes. Always be sure of your footing. A slip and fall can cause serious personal injury.
10. Never operate mower without proper guards, plates or other safety protective devices in place.
11. Muffler and engine become hot and can cause a burn. Do not touch.
12. Do not operate this mower with the chute door open, unless the complete grass catcher or chute deflector is properly mounted on the mower.



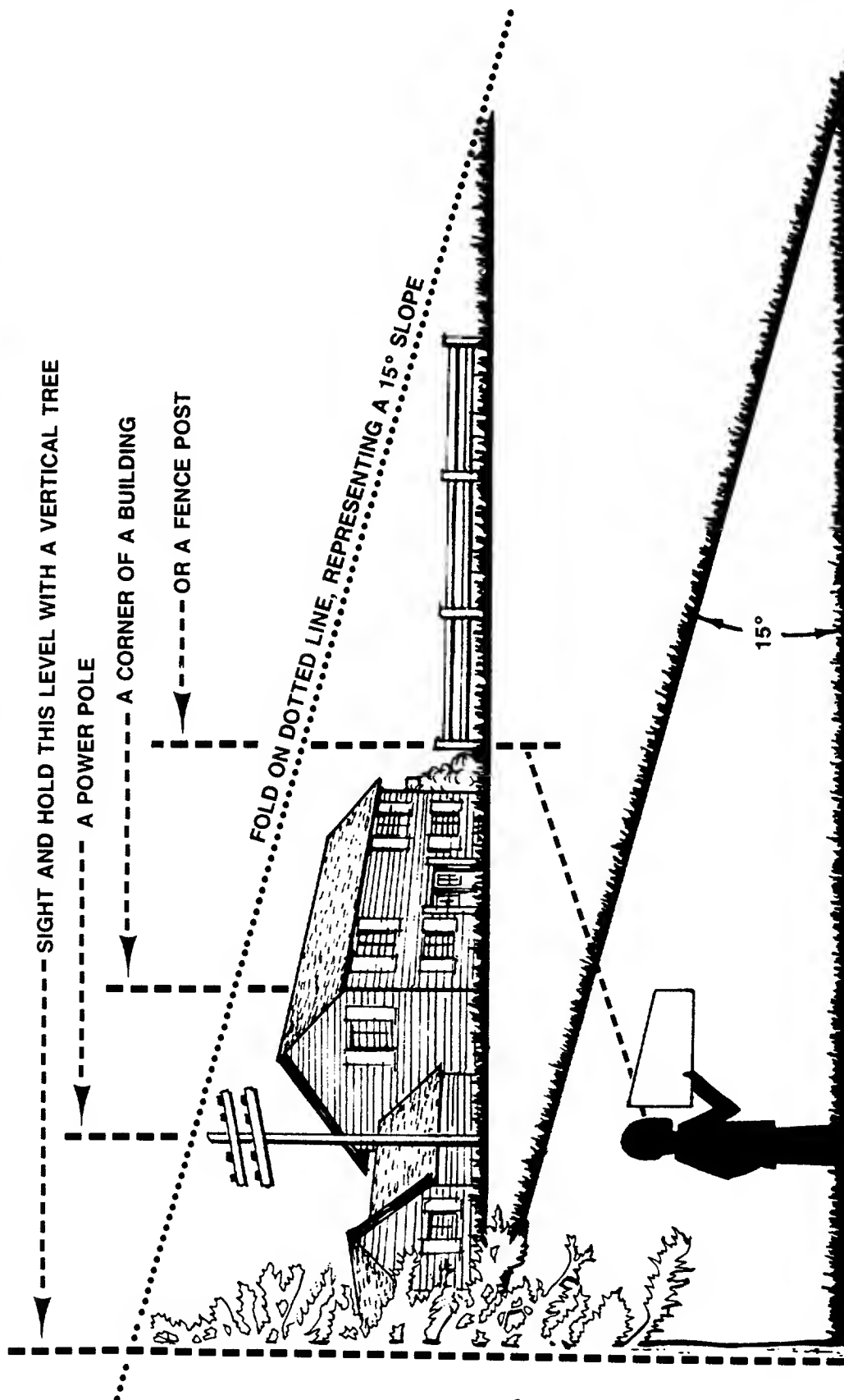
MAINTENANCE AND STORAGE

1. Check the blade and engine mounting bolts at frequent intervals for proper tightness. Also visually inspect blade for damage (e.g. bent, cracked). Replace with blade which meets original equipment specifications.
2. Keep all nuts, bolts, and screws tight to be sure the equipment is in safe working condition.
3. Never store the mower with gasoline in the tank or gas containers inside of a building where fumes may reach an open flame or spark (e.g. gas hot water heater). Allow the engine to cool before storing in any enclosure.
4. To reduce fire hazard, keep the engine free of grass, leaves and excessive oil.
5. Check the grass catcher bag frequently for wear or deterioration. Replace a worn or damaged bag immediately. For safety protection, replace only with new bag meeting original equipment specifications.

USE THIS SHEET AS A GUIDE TO DETERMINE SLOPES WHERE YOU MAY NOT OPERATE SAFELY.

SLOPE GAUGE

(Keep this sheet in a safe place for future reference.)



Do not mow on inclines with a slope in excess of 15 degrees (a rise of approximately 2½ feet every 10 feet). A riding mower could overturn and cause serious injury. If operating a walk-behind mower on such a slope, it is extremely difficult to maintain your footing and you could slip, resulting in serious injury.

Operate RIDING mowers up and down slopes, never across the face of slopes.

Operate WALK-BEHIND mowers across the face of slopes, never up and down slopes.

CONTENTS OF HARDWARE PACK/PARTS IDENTIFICATION

Remove this sheet from your owner's manual and lay the hardware on the illustration for identification purposes. After assembly, keep the Slope Gauge which is on the reverse side of this sheet for future use.
(Hardware pack may contain extra items which are not used on your unit.)

A ATTACHING THE LOWER HANDLE

Hairpin Clips (714-0104)

B ATTACHING THE UPPER HANDLE

Curved Head Bolts (710-0671)

Split Washers 5/16" I.D. (736-0119)

Hex Nuts 5/16-18 Thread (712-0267)

C ATTACHING THE DRIVE CLUTCH CONTROL CABLE

Phillips Head Screws (710-0841)

Plastic Cap (731-1059)

D SECURING THE CABLES

Cable Ties (726-0240)

PARTS IDENTIFICATION

Blade Control Handle

Drive Control Housing

Throttle Control Housing

Upper Handle

Lower Handle

Rear Deflector

Spark Plug

Grass Catcher

Handle Mount Bracket

E ASSEMBLY OF GRASS CATCHER

Flat Washer 1/4" I.D. x 5/8" O.D. (736-0463)

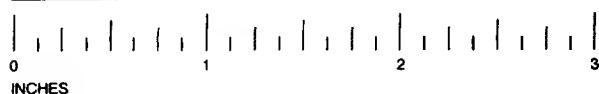
Self-Tapping Screws (710-0892)

Shoulder Bolt (738-0137)

Wave Washer 3/8" I.D. (736-0286)

Internal "Star" Washer 1/2" I.D. (736-0498)

Locking Lever (720-0224)



ASSEMBLY INSTRUCTIONS

IMPORTANT: This unit is shipped **WITHOUT GASOLINE or OIL**. After assembly, service engine with gasoline and oil as instructed in the separate engine manual packed with your unit.

NOTE: Reference to right or left hand side of the mower is observed from the operating position.

Tools Required for Assembly

- (1) Pair of Pliers
- (1) 1/2" Wrench*
- (1) 5/16" Wrench or Nutdriver*
- (1) Phillips Screwdriver
- (1) Flat Blade Screwdriver

*Or one 6" Adjustable Wrench.

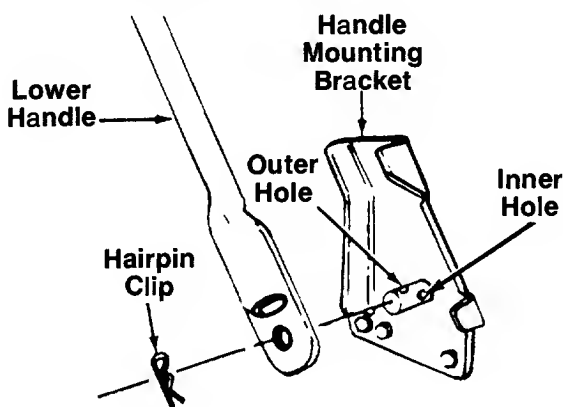


FIGURE 1.

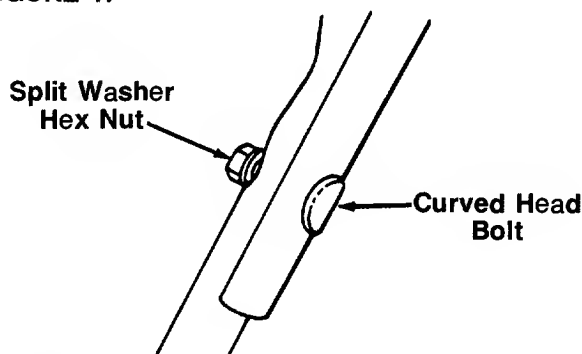


FIGURE 2.

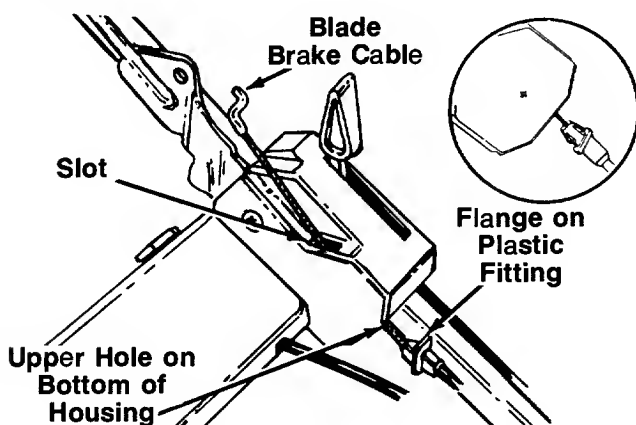


FIGURE 3.

UNPACKING

1. Remove the lawn mower from the carton by opening the top flaps and lifting the unit out. Be careful of the staples. Make certain all parts and literature have been removed from the carton before the carton is discarded.
2. Disconnect the spark plug wire and move away from the spark plug.
3. Stretch out all control cables and place on the floor. Be careful not to bend or kink the cables at any time during assembly.
4. Remove page four from this manual and lay the contents of the hardware pack on the illustration for identification.

ATTACHING THE LOWER HANDLE (Hardware A)

1. Attach the lower handle by placing the bottom holes in the lower handle over the weld pins on the handle mounting brackets on the rear of the deck.
2. Using a pair of pliers, squeeze one leg of the lower handle against the handle mounting bracket. Insert the hairpin clip into the inner hole on the weld pin. See figure 1. Repeat on other side.

NOTE: There are two (2) holes in the handle mounting brackets. Place the hairpin clip in the inner hole for operation. Outer hole is for storage.

ATTACHING THE UPPER HANDLE (Hardware B)

Place the upper handle in position over the lower handle. The label on the throttle control housing and the control lever must be facing up. Secure the upper handle using two curved head bolts, split washers and hex nuts as shown in figure 2.

ATTACHING THE BRAKE CABLE

1. The brake cable is attached to the engine, and has a "Z" fitting on the loose end. Route the brake cable below the lower handle. Place end of cable into the upper hole on the bottom of the control housing, and through the slot as shown. The angle of the plastic flange must be positioned downward as shown in figure 3. Be careful not to bend or kink the cable at any time.
2. Push the plastic fitting until it locks into the control housing.



WARNING: Brake cable must be assembled as shown for proper blade brake operation.

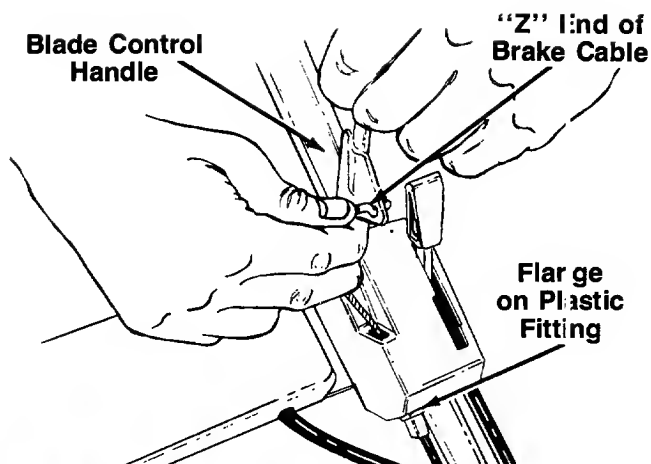


FIGURE 4.

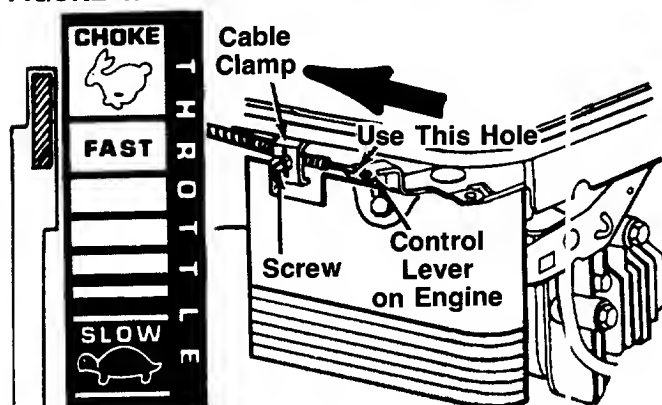


FIGURE 5.

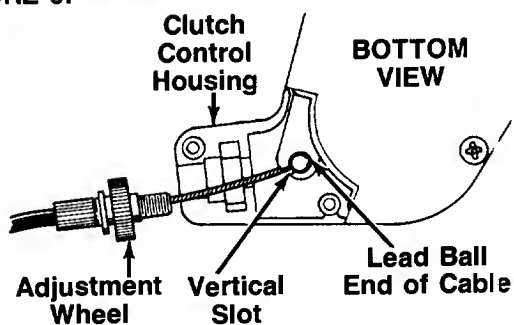


FIGURE 6.

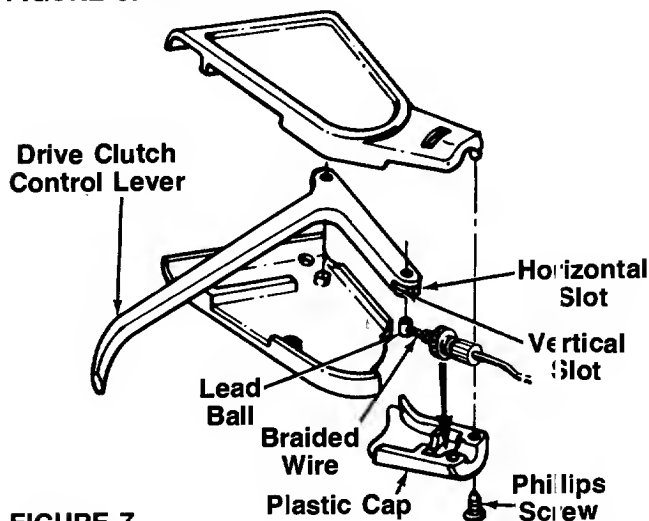


FIGURE 7.

3. Hook the "Z" end of the brake cable into the hole in the blade control handle from the inside to the outside as shown in figure 4.

ATTACHING THE THROTTLE CABLE

1. Push the throttle control lever on the handle all the way forward to CHOKE position. See figure 5.
2. The throttle control cable is attached to the upper handle. Route the throttle control cable under the lower handle and inside the handle mounting bracket. Hook the "Z" end of the throttle control cable into the smaller hole in the control lever on the engine. See figure 5.
3. Using a screwdriver, remove the screw and cable clamp shown in figure 5. Remove the cable clamp from the cable.
4. Push the control lever on the engine as far toward the rear of the engine as it will go. Secure the cable in this position with the cable clamp and screw.

ATTACHING THE DRIVE CLUTCH CONTROL CABLE (Hardware C)

The drive clutch control cable is attached to the deck. Route the cable under the lower handle. Attach the cable to the lever in the clutch control housing, located in the middle of the upper handle, as follows.

1. Place the lead ball end of the cable into the fitting provided in the end of the clutch control lever. Slip the braided wire into the vertical slot as shown in figure 6.
2. Slide the braided wire around in the horizontal slot. See figure 7.
3. Make certain the adjustment wheel is threaded onto the cable as far as possible as shown in figure 6. Place the adjustment wheel into the clutch control housing.
4. Secure the plastic cap to the clutch control housing using the two Phillips head screws. See figure 7.



WARNING: Drive clutch adjustment must be checked before the unit is operated, as described in the Operation Section.

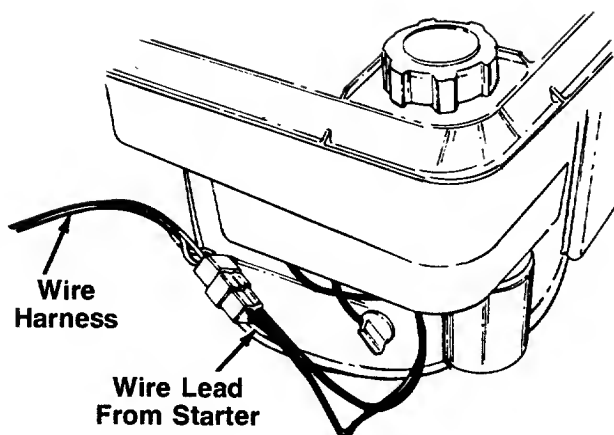


FIGURE 8.

ATTACHING THE WIRE HARNESS

Plug the end of the wire lead coming from the starter on the engine into the plug on the end of the wire harness. See figure 8.

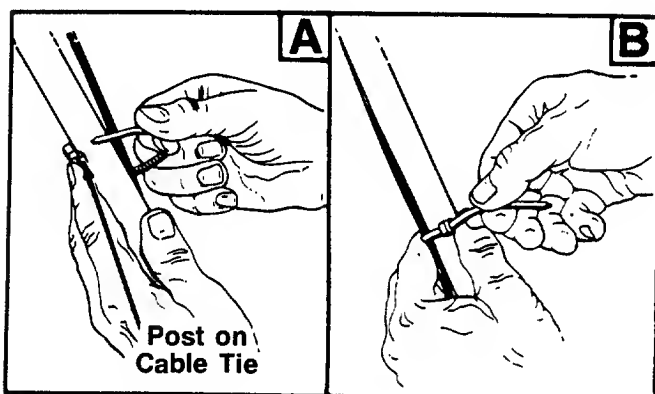


FIGURE 9.

SECURING THE CABLES (Hardware D)

Secure all cables to the left side of the handle as follows.



WARNING: When attaching the control cables, the cables must be routed to avoid contact with all sharp edges and hot surfaces to prevent damage to the cables, which will render the controls inoperative.

- A. Insert posts on cable ties into holes provided on the lower handle. The holes may be either on the inside or outside of the handles. See figure 9A.
- B. Secure the cables with the cable ties. See figure 9B.
- C. Trim excess ends of cable ties.

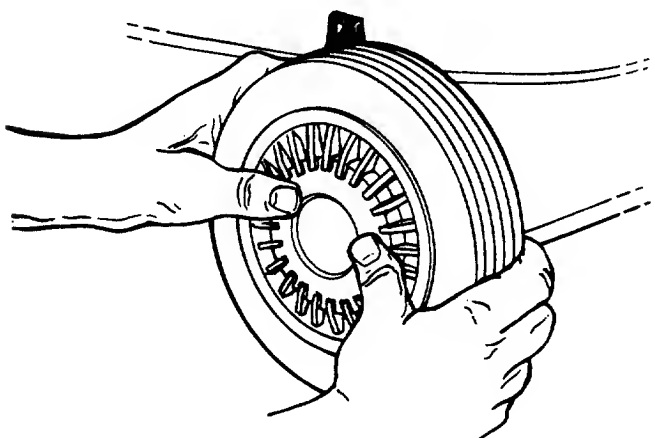


FIGURE 10.

INSTALLATION OF HUB CAPS (Optional)

Place hub caps in position against the inner hub of the wheel. Press firmly around the center portion of the hub cap in a circular motion, similar to installing a lid on a round, plastic container. See figure 10. The hub caps are flexible and will snap over the 3½" diameter wheel hubs.

NOTE: It may be helpful to place the hub caps in hot tap water for several minutes to make them pliable before installing, especially if the temperature is less than 60°F.

FINAL ASSEMBLY OF MOWER

1. Make certain all nuts and bolts are tightened securely.
2. **Be certain to charge the battery** as instructed in "Before Starting" section under Operation. Read instructions carefully.

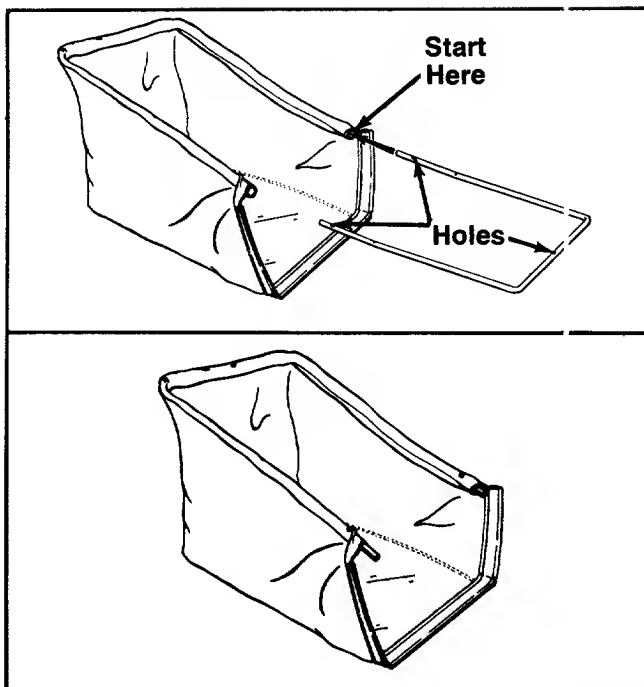


FIGURE 11.

ASSEMBLY OF GRASS CATCHER (Hardware F)

NOTE: Make certain the grass bag is turned right side out before assembling (warning label will be on the outside).

1. There are three holes in the rear frame. With the holes on the upper side as shown in figure 11, insert one end of the rear frame into the cloth channel on the edge of the grass catcher bag. Feed all the material on one side of the frame before working it around the frame. See figure 11.

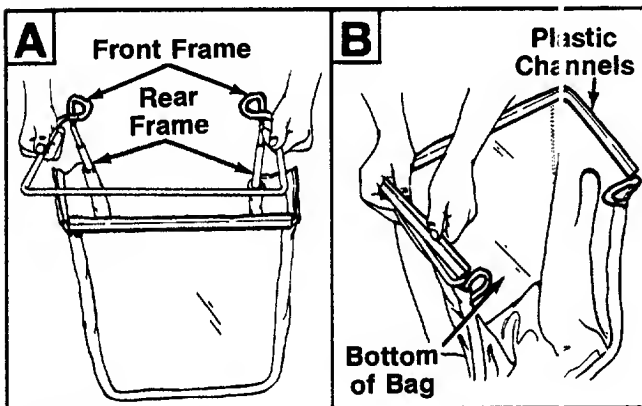


FIGURE 12.

2. Slide the ends of the front frame assembly into the ends of the rear frame as shown in figure 12.
3. Secure front of bag to front frame by slipping plastic channels on sides and bottom of bag over frame. See figure 12.

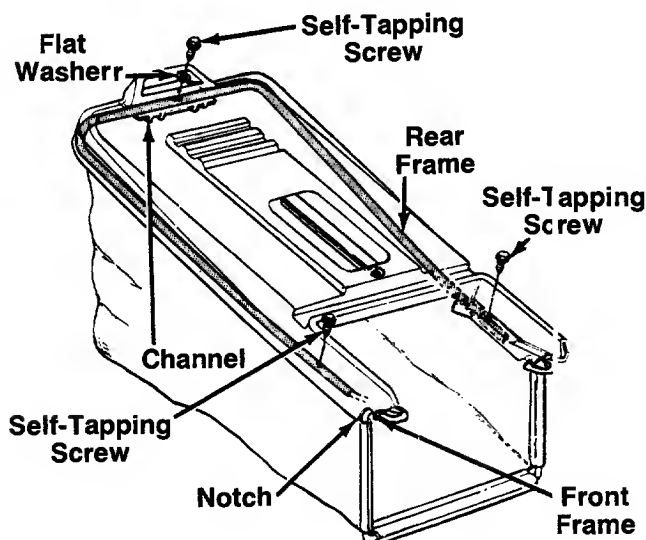


FIGURE 13.

4. Attach the hardtop cover to the grass catcher as follows. See figure 13.

- a. Place the cover in position on top of the grass catcher. Press the rear frame into the channel on the rear of the cover (beneath the rear handle).
- b. Slide the notches on the sides of the cover over the front catcher frame.
- c. Attach rear of cover to frame using the flat washer and one self-tapping screw as shown in figure 13. Attach the sides of the cover to frame with the other two self-tapping screws.

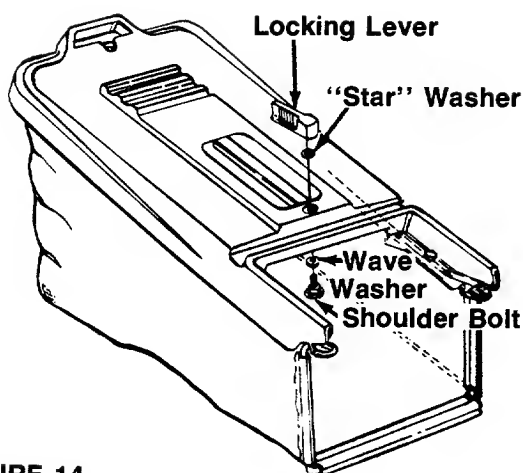


FIGURE 14.

5. Assemble the locking lever as follows:

- Place wave washer on shoulder bolt (crowned side of washer goes against the head of bolt).
- Insert shoulder bolt up through hole in hardtop cover as shown in figure 14. Place "star" washer over shoulder bolt.
- Thread shoulder bolt into the grass catcher locking lever, using a 9/16" socket wrench. Do not overtighten. Locking lever must be able to pivot.

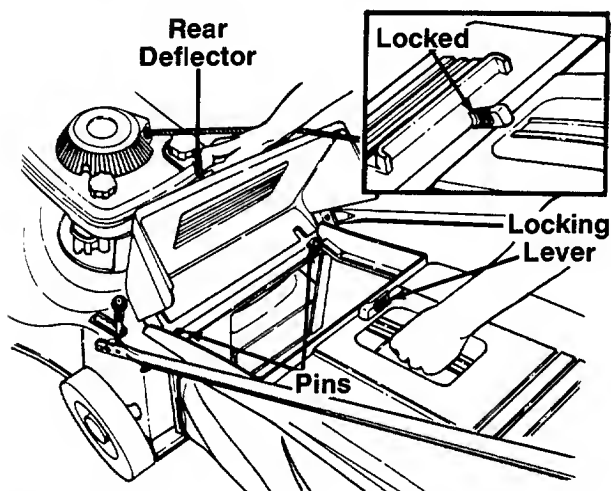


FIGURE 15.

ATTACHING BAG TO MOWER

Lift the rear deflector on the mower. Place the loops on the grass catcher frame over the pins on the back of the mower. See figure 15. Release the rear deflector. Turn the locking lever to the locked position to secure the rear deflector. See figure 15, inset.

To remove the grass catcher, turn the locking lever to the unlocked position and lift the rear deflector on the mower. Lift the grass catcher up, over the pins on the back of the mower. Release the deflector.

CONTROLS

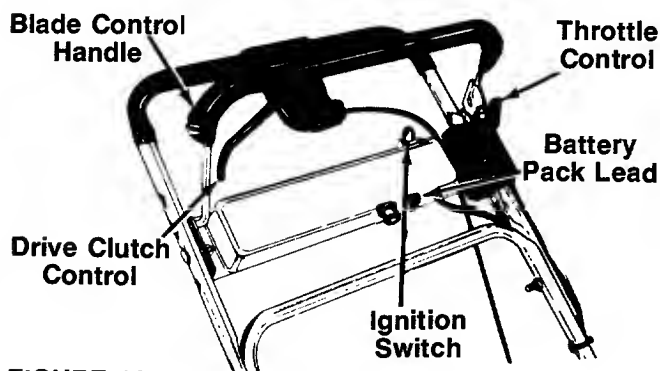


FIGURE 16.

BLADE CONTROL HANDLE



WARNING: This control mechanism is a safety device. Never attempt to bypass its operations.

The blade control handle is located on the upper handle of the mower. See figure 16. The blade control handle must be depressed in order to operate the unit. Release the blade control handle to stop the engine and blade.



WARNING: The blade will be rotating whenever the engine is running.

THROTTLE CONTROL

The throttle control is located on the left side of the upper handle. It is used to regulate the engine speed. The engine should be started with the engine in the CHOKE position.



WARNING: The throttle control cannot be used to stop the engine.

IGNITION SWITCH

The ignition switch is located on the left side of handle panel. It is used for starting only. See figure 16.

DRIVE CLUTCH CONTROL

Squeezing the drive clutch control engages the drive mechanism to the rear wheels. Releasing the clutch control stops the rear wheels from driving. Release the drive clutch control to slow down when negotiating an obstacle, making a turn or stopping. See figure 16.

OPERATION



FIGURE 17.

Keep hands and feet away from the chute area on cutting deck. See figure 17.

NOTE: For shipping purposes your mower is set with the wheels in a low cutting height position. For best results raise the cutting position until it is determined which height is best for your lawn. See cutting height adjustment section.

GAS AND OIL FILL-UP

Service the engine with gasoline and oil as instructed in the separate engine manual packed with your mower. Read instructions carefully.



WARNING: Never fill fuel tank indoors, with engine running or until the engine has been allowed to cool for at least two minutes after running.

BEFORE STARTING



WARNING: The battery contains corrosive fluid and toxic material. **HANDLE WITH CARE.** Keep away from children. Do not puncture, disassemble, mutilate or incinerate. Explosive gases could be vented during charging or discharging. Use in a well-ventilated area, away from sources of ignition.

1. Charge battery for 16 hours before initial use. DO NOT CHARGE LONGER THAN 20 HOURS.

IMPORTANT: Use only the battery charger supplied with this mower.

To charge the battery, first remove the protective cap from the end of the battery pack lead. Always plug charger lead into battery pack lead before inserting battery charger plug into 120 volt standard household outlet.

After charging, disconnect battery charger plug from household outlet first, then disconnect charger lead from battery pack lead.



WARNING: Do not remove the battery pack from the handle panel for any reason other than replacement. When replacing the battery pack, refer to instructions in Maintenance section.

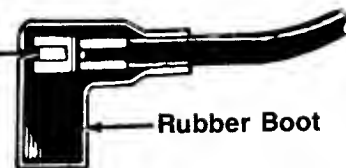
2. Before each use, check for proper drive clutch operation by performing the following before starting the engine:

With the drive clutch control released, push mower forward. It should move freely. **Pull mower backward. It should move freely.**

If it does not and the rear wheels tend to lock up, the clutch may not be releasing completely. Do not start the engine until corrections have been made. Check the control cable for severe bend, kinks and binding, or grass build-up in the pulley groove. Correct and adjust as required.

3. Attach spark plug wire to spark plug. Make certain the metal loop on the end of the spark plug wire (inside the rubber boot) is fastened securely over the metal tip on the spark plug. See figure 20.

Metal Loop
on Spark
Plug Wire



Rubber Boot

FIGURE 18.

4. Open fuel shut-off valve (if so equipped). Refer to separate engine manual.

TO START ENGINE AND ENGAGE BLADE



WARNING: When starting the unit for the first time, face the mower against a solid object such as a wall, fence, etc. Start the unit, and if it shows any signs of motion with the drive clutch control disengaged, shut the engine off immediately. Make certain the drive clutch control is adjusted so the drive belt is as loose as possible. Refer to the adjustment section.

1. Move the throttle control lever to CHOKE position.

NOTE: A warm engine may not require choking.

2. Standing behind the unit, depress the blade control handle and hold it against the upper handle as shown in figure 19. Be certain the drive clutch handle is released.

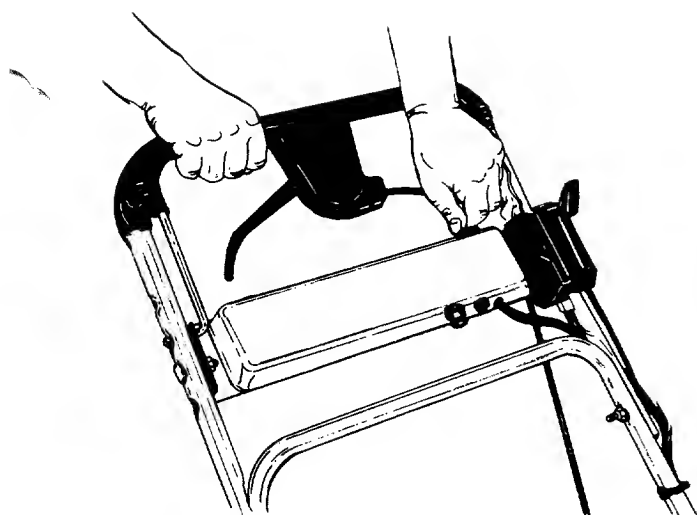


FIGURE 19.

3. Turn the ignition key to the right to start the engine. Release the key after engine starts.
4. After engine starts, move throttle control to FAST or desired engine speed. Move the throttle control at least halfway back, then forward to obtain FAST position.

NOTE: The engine on your unit is provided with an auxiliary recoil starter system. To start the engine using the auxiliary starter system, proceed as follows.

- A. Depress the blade control handle, and hold it against the upper handle.
- B. Grasp the recoil starter handle, slowly pull the rope out from the engine about two feet and hold rope in this position.
- C. Step behind the handle into the operating position. With the blade control handle still depressed, pull recoil starter handle using a quick, firm motion. Repeat until engine starts. After engine starts, return rope slowly to the engine.

TO STOP ENGINE AND BLADE

1. Release the blade control handle to stop the engine and blade.



WARNING: The blade continues to rotate for a few seconds after the engine is shut off.

2. Disconnect the spark plug wire and ground it against the engine to prevent accidental starting while equipment is unattended.

NOTE: If any problems are encountered, refer to the Trouble Shooting Guide on page 20.

USING YOUR ROTARY MOWER



WARNING: Never operate your unit without either the rear deflector or entire grass catcher assembly in place.

Be sure that lawn is clear of stones, sticks, wire, or other objects which could damage lawn mower or engine. Such objects could be accidentally thrown by the mower in any direction and cause serious personal injury to the operator and others.

For the best results, do not cut wet grass because it tends to stick to the underside of the mower, preventing proper discharge of grass clippings, and could cause you to slip and fall. New grass, thick grass or wet grass may require a narrower cut. Blade speed should be adjusted to the condition of the lawn.

For best results, cut off one-third or less of the total length of the grass. Lawn should be cut in the fall as long as there is growth.

This mower is designed to be operated at full throttle to give you the best cut and do the most effective job of bagging the cut grass.



WARNING: If you strike a foreign object, stop the engine. Remove wire from spark plug, thoroughly inspect the mower for any damage, and repair the damage before restarting and operating the mower. Extensive vibration of the mower during operation is an indication of damage. The unit should be promptly inspected and repaired.

ADJUSTMENTS



WARNING: Do not at any time make any adjustment to lawn mower without first stopping engine and disconnecting spark plug wire.

DRIVE CLUTCH CONTROL ADJUSTMENT

Use the adjustment wheel located in the clutch control housing to tighten the drive belt if mower does not self-propel with the drive clutch control engaged, or if drive belt is slipping (unit hesitates while engine maintains the same speed). See figure 20.

In addition, the adjustment wheel may also be used to determine the position in which the drive clutch control is engaged. If it is more comfortable to have the drive engaged with the lever further away from the handle, tighten the drive belt.

Make certain to retest the unit for neutral as instructed in the Operation Section. Move the adjustment wheel in the opposite direction to loosen the drive belt if necessary.

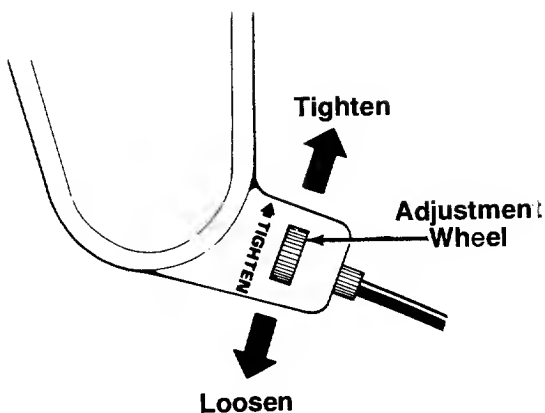


FIGURE 20.

CUTTING HEIGHT ADJUSTMENT

The height adjustment handle is located on the left side of the deck. The handle may be placed in one of nine cutting height positions. Push the handle to the left and then either forward to lower the cutting height or backward to raise the cutting height. See figure 21.

For rough or uneven lawns, move the height adjustment handle to a position which will give a higher cutting height.

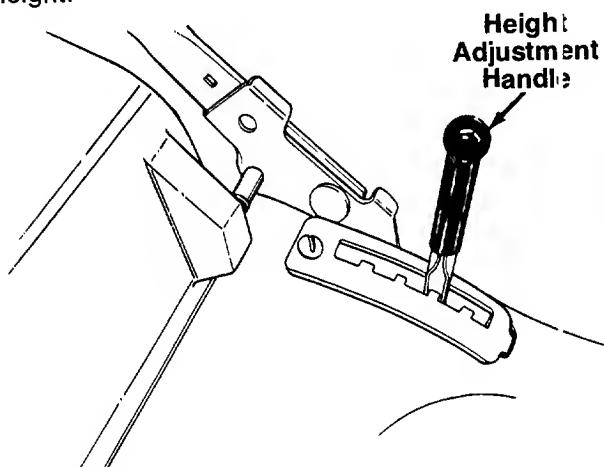


FIGURE 21.

THROTTLE

The throttle control wire assembly can be adjusted if necessary. Loosen the screw on the cable clamp shown in figure 5. Adjust as instructed in steps 1 and 4 of "Attaching the Throttle Control Cable" in Assembly Instructions.

CARBURETOR ADJUSTMENTS



WARNING: If any adjustments are made to the engine while the engine is running (e.g. carburetor), keep clear of all moving parts. Be careful of heated surfaces and muffler.

Minor carburetor adjustment may be required to compensate for differences in fuel, temperature, altitude and load. Refer to the separate engine manual

packed with your mower for carburetor adjustment information.

NOTE: A dirty air cleaner will cause an engine to run rough. Be certain air cleaner is clean and attached to the carburetor before adjusting carburetor.

LUBRICATION



WARNING: Always stop engine and disconnect spark plug wire before cleaning, lubricating or doing any kind of work on lawn mower.

Blade Control—Lubricate the pivot points on the blade control handle and the brake cable at least once a season with light oil. See figure 22. The blade control must operate freely in both directions.

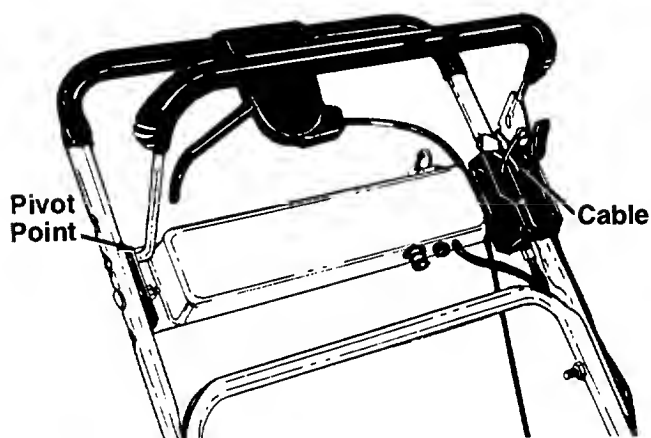


FIGURE 22.

Chute Deflector Mechanism—The torsion spring and pivot point should be lubricated periodically with light oil to prevent any rust or binding. Deflector must work freely.

Wheels—Mower may be provided with ball bearing wheels. Lubricate at least once a season with light oil. Also, if the wheels are removed for any reason, lubricate the surface of the axle bolt and the inner surface of the wheel with light oil. A 4 oz. plastic bottle of light oil lubricant is available. Order part number 737-0170. Engine oil may also be used.

Engine—Follow engine manual for lubrication instructions.

Throttle—Periodically lubricate throttle control lever and throttle wire assembly with a few drops of light oil for ease of operation.

Transmission—The transmission is pre-lubricated and sealed at the factory. It does not require checking. If disassembled for any reason, fill with 2 ounces of Alvania grease, part number 737-0168.

MAINTENANCE



WARNING: Be sure to disconnect and ground the spark plug wire before performing any repairs or maintenance.

NOTE: When tipping the unit, empty the fuel tank and keep engine spark plug side up.

TROUBLE SHOOTING

Refer to page 20 of this manual for trouble shooting information.

BATTERY PACK REPLACEMENT

Remove the battery pack from the handle panel for replacement only. Do not separate the batteries for any reason. Dispose of batteries properly.



WARNING: Batteries contain sulfuric acid which may cause burns. Do not short circuit or mutilate in any way. Do not put batteries in fire. They may burst or release toxic materials.

When replacing battery pack in handle panel, battery pack must be positioned with the positive terminal to the right hand side and the negative terminal to the left hand side of panel. See figure 23. Replacing the battery pack incorrectly will cause serious damage.

The positive lead on the wire harness has the smaller connector. Connect the positive lead to the positive side of the battery pack, then connect the negative side.

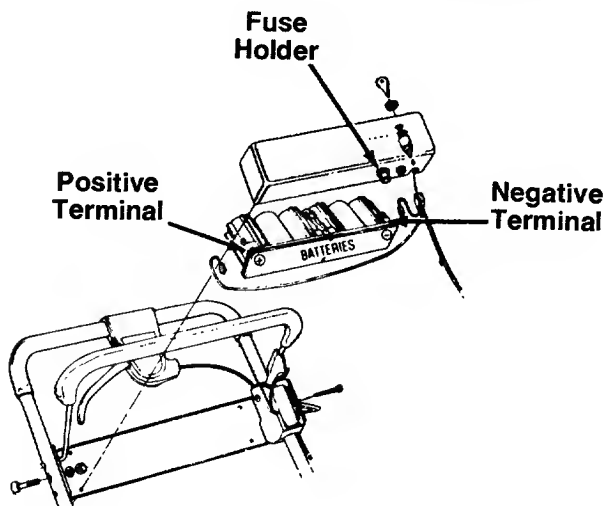


FIGURE 23.

IN-LINE FUSE

The unit is equipped with an in-line fuse. If unit fails to start, check the fuse in the wiring harness by turning the end of the fuse holder and removing from the battery cover. See figure 23. Replace with standard automotive 7½ amp fuse.

CUTTING BLADE

When removing the cutting blade for sharpening or replacement, protect hands by using heavy gloves or a rag to grasp the cutting blade. Remove the bolt and bell washer which hold the blade and adapter to the engine crankshaft. Remove the blade and adapter from the crankshaft.

If the blade or blade adapter needs replacing, remove the two small bolts, lock washers and nuts which hold the blade to the adapter.



WARNING: Periodically inspect the blade adapter for cracks, especially if you strike a foreign object. Replace when necessary.

When sharpening the blade, follow the original angle of grind as a guide. It is **extremely important** that each cutting edge receives an equal amount of grinding to prevent an unbalanced blade. An unbalanced blade will cause excessive vibration when rotating at high speeds, may cause damage to the mower and could break, causing personal injury.

It is recommended that the blade always be removed from the adapter for the best test of balance.

The blade can be tested by balancing it on a round shaft screwdriver. Remove metal from the heavy side until it balances evenly.

Before reassembling the blade and the blade adapter to the unit, lubricate the engine crankshaft and the inner surface of the blade adapter with light oil. Lubricating the bolt holes, bolts and inner surface of the nuts with light oil is also recommended. A 4 oz. plastic bottle of light oil lubricant is available. Order part number 737-0170. Engine oil may also be used.

When replacing the blade, be sure to install the blade with the side of the blade marked "Bottom" (or with part number) facing the ground when the mower is in the operating position.

Blade Mounting Torque

Center Bolt and Blade Adapter Bolts:
375 in. lb. min., 450 in. lb. max.

To insure safe operation of your unit, **all** nuts and bolts must be checked periodically for correct tightness.

DECK

The underside of mower deck should be cleaned after each use to prevent a buildup of grass clippings, leaves, dirt or other matter. If this debris is allowed to accumulate, it will invite rust and corrosion, and may cause an uneven discharge of grass clippings at the next cutting.

The deck may be cleaned by tilting the mower and scraping clean with a suitable tool (make certain the spark plug wire is disconnected).

ENGINE

Refer to the separate engine manual for all engine maintenance instructions.

Maintain **engine oil** as instructed in the separate engine manual packed with your unit. Read and follow instructions carefully.

Service **air cleaner** every 25 hours under normal conditions. Clean every few hours under extremely dusty conditions. Poor engine performance and flooding usually indicates that the air cleaner should be serviced. To service the air cleaner, refer to the separate engine manual packed with your unit.

The **spark plug** should be cleaned and the gap reset once a season. Spark plug replacement is recommended at the start of each mowing season; check engine manual for correct plug type and gap specifications.

Clean the engine regularly with a cloth or brush. Keep the cooling system (blower housing area) clean to permit proper air circulation which is essential to engine performance and life. Be certain to remove all grass, dirt and combustible debris from muffler area.

STORAGE OF THE BATTERY

The battery must be stored with a full charge. A discharged battery will freeze.

IMPORTANT: All batteries discharge during storage.

Recharge battery every two months and before returning to service. Refer to charging instructions on page 10.

BELT REMOVAL AND REPLACEMENT

1. Disconnect the spark plug wire and ground it against the engine.
2. Drain the fuel tank or place a piece of plastic beneath the cap to prevent gasoline leakage.
3. Tip the mower back on its handle. Block securely.
4. Remove the rear belt baffle by removing the lock washer and hex nut shown in figure 24. Then remove one Torx bolt, using a #27 Torx driver. A 9/64" Allen wrench may also be used. Then remove one carriage bolt, lock washer and nut as shown.

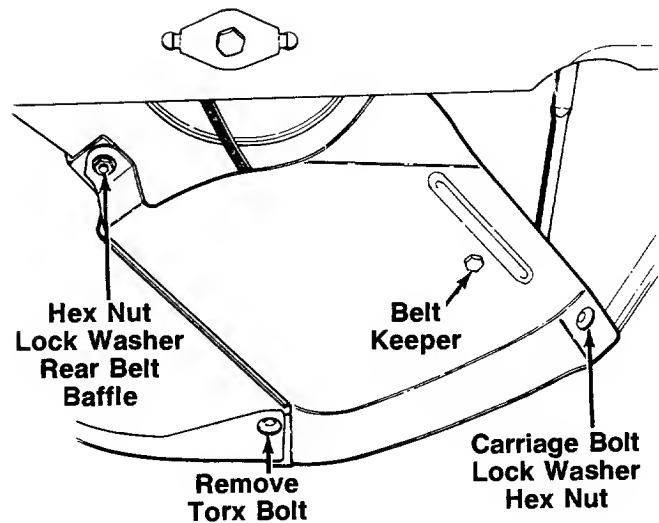


FIGURE 24.

5. Roll the belt off the transmission pulley. Remove the belt from between the idler pulley and belt guard. See figure 25.
6. Remove the belt from the pulley on the engine crankshaft, and pull it over the blade.

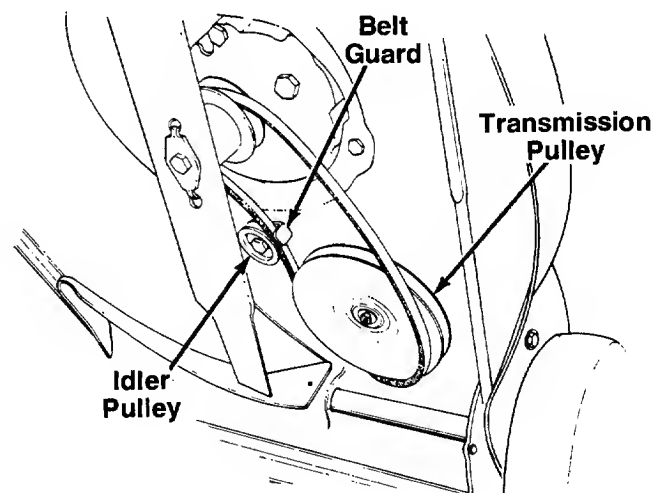


FIGURE 25.

7. Reassemble in reverse order with the new belt.

NOTE: When reassembling the rear belt baffle, make certain the belt keeper is outside of the belt, and the edge of the rear belt baffle is between the rear chute baffle and the rear panel as shown in figure 24. Make certain to tighten all nuts and bolts securely. If plastic was placed under the gas cap, be certain to remove it.

OFF-SEASON STORAGE

The following steps should be taken to prepare lawn mower for storage.

1. Clean and lubricate mower thoroughly as described in the lubrication instructions.
2. Refer to engine manual for correct engine storage instructions.
3. Coat mower's cutting blade with chassis grease to prevent rusting.
4. Follow battery storage instructions on page 14.
5. Store mower in a dry, clean area.

NOTE: When storing any type of power equipment in an unventilated or metal storage shed, care should be taken to rustproof the equipment. Using a light oil or silicone, coat the equipment, especially cables and all moving parts.

HANDLE STORAGE

The handle may be placed in an upright position for storage. Move hairpin clips to outer hole on weld pins. See figure 1. Press outward on the bottom of the lower handle and push forward. The handle will lock in this position.

Reverse the above procedure to place the handle in the operating position.

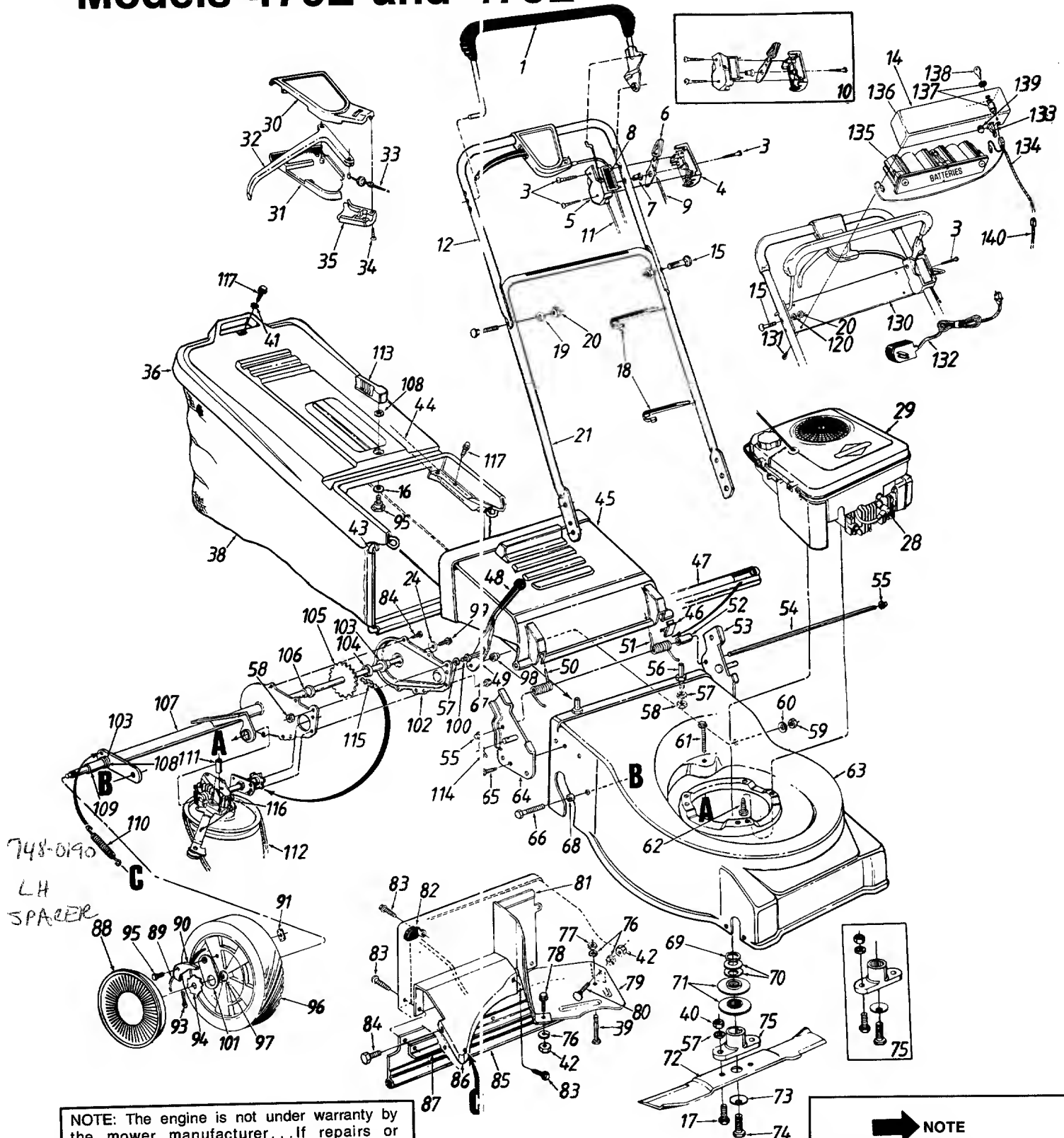
NOTE: The use of any accessory on this Rotary Mower other than those manufactured by the mower manufacturer is **not** recommended.



WARNING: To reduce the risk of injury, do not operate mower unless rear trailing shield and guard or entire grass catcher is in its proper place.

NOTE: Under normal usage bag material is subject to wear and should be checked periodically. Be sure any replacement bag complies with the mower manufacturer's recommendations. For replacement bags, use only factory authorized replacement bag.

Models 476E and 478E



NOTE: The engine is not under warranty by the mower manufacturer... If repairs or service is needed on the engine, please contact your nearest authorized engine service outlet. Check the "Yellow Pages" of your telephone book under "Engines—Gasoline."

Find It Fast
In The
Yellow Pages

NOTE

This instruction manual covers various models, and all specifications shown do not necessarily apply to your model. Specifications subject to change without notice or obligation.

Models 476E and 478E

PARTS LIST FOR MODELS 476E AND 478E ROTARY MOWERS

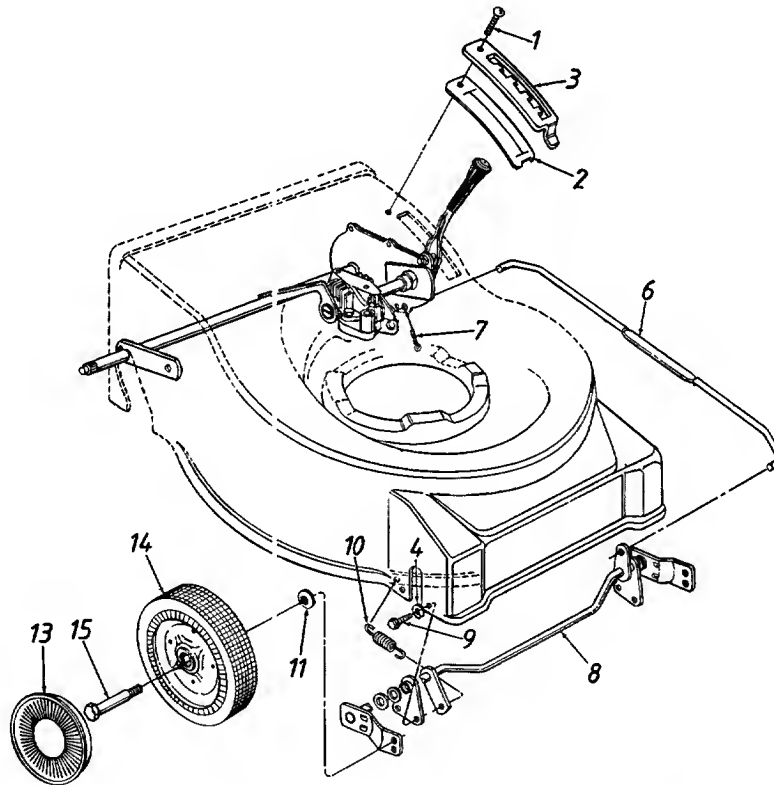
REF. NO.	PART NO.	CODE	DESCRIPTION	REF. NO.	PART NO.	CODE	DESCRIPTION
1	731-0609		Control Handle Ass'y.	62	710-0654A		Hex L-Wash. Hd. Scr.
3	710-0796		Truss Mach. B-Tap Scr.				3/8-16 x 1" Lg.
			#12 x 1.5" Lg.	63	16997A	638/N	21" Deck Ass'y.
4	731-0817A		Control Panel Half	64	12296A		Handle Brkt. Ass'y.—R.H.
5	731-0816A	N	Clutch Panel Half	65	710-0892		Hex L-Wash. Hd. AB-Tap Scr.
6	731-0972		Throttle Control Lever				1/4 x .62" Lg.
7	731-0524		Control Disc Pin	66	710-1006		Hex Wash. Hd. Tap Scr.
8	777-5812		Control Label—Throttle				3/8-16 x .75" Lg.
9	746-0672		Throttle Wire—58" Lg.	67	710-0599		Hex Wash. Hd. Tap Scr.
10	753-0430		Control Housing Comp.				1/4-20 x .5" Lg.
11	746-0554A	N	Control Cable—40.5" Lg. 43"	68	750-0736		Spacer .383" I.D.
12	749-0439B	N	Upper Handle	69	736-0409		Serrated Washer 1.0" I.D.
14	777-5902		Instruction Label	70	736-0408		Wave Washer 1.005" I.D.
15	710-0671		Curved Carriage Bolt	71	756-0502		Serrated Pulley Half
			5/16-18 x 1.38" Lg.	72	742-0306A		21" Blade
16	736-0286		Bowed Washer	73	736-0453		Bell-Wash. .46" I.D.
17	710-1055		Hex Bolt 3/8-24 x 1" Lg.	74	710-0757		Hex Bolt 7/16-20 x 1.5" Lg.
18	726-0240		Cable Tie				(Gr. 5)
19	736-0119		L-Wash. 5/16" I.D.*	75	753-0485		Blade Adapter Kit
20	712-0267		Hex Nut 5/16-18 Thd.*	76	736-0329		L-Wash. 1/4" I.D.*
21	749-0504C		Lower Handle	77	712-0298		Hex Jam Nut 1/4-20 Thd.
24	736-0270		Bell-Wash. .265" I.D. x .75"	78	710-0252		Hex Bolt 1/4-20 x .85" Lg.
28	735-0639		Spark Plug Boot	79	17013		Rear Belt Baffle
29	—		Engine	80	710-0167		Carr. Bolt 1/4-20 x .50" Lg.*
30	731-1057		Control Cover Half—Upper	81	17006		Rear Panel Baffle
31	731-1058		Control Cover Half—Lower	82	731-0931		Corner Plug
32	731-0620		Control Lever	83	710-1017		Torx Mach. AB-Tap Scr. 1/4 x
33	746-0711A		Adj. Drive Cable—51" Lg.				.62" Lg.
34	710-0841		Flat C-Sunk Hd. Tap Scr.	84	710-0352		Hex B-Tap Scr. 1/4 x .38" Lg.
			#10 x .75" Lg.	85	731-0668		Rear Flap
35	731-1059		Cable Mtg. Cap	86	17008		Rear Chute Baffle
36	731-0857A		Hardtop Bag Cover	87	14847		Retaining Strip
38	764-0252		Grass Bag††	88	731-0981A		Hub Cap
39	710-0166		Truss Mach. Scr. 1/4-20 x	89	10622B		Plastic Spring
			1.0" Lg.	90	748-0188B		Pawl .345" I.D.
40	712-0241		Hex Nut 3/8-24 Thd.	91	712-0189		Weld Nut 1/4-20 Thd.
41	736-0463		Fl-Wash. .281" I.D. x .62"	93	714-0115		Cotter Pin 1/8" Dia.
42	712-0287		Hex Nut 1/4-20 Thd.*	94	748-0318		Ratchet Wheel 1.62" O.D.
43	764-0411	N	Front Catcher Frame	95	738-0137		Shld. Bolt .342" Dia. x .268"
44	749-0736A		Rear Catcher Frame	96	734-1510B		Wheel Ass'y. Comp.—Rear
45	731-0859		Chute Deflector	97	734-0486B		Bearing 1/2" I.D.
46	731-0970B	N	Deflector Plug	98	750-0624		Shld. Spacer .50" Dia.
47	731-0858		Seal—Extrusion	99	710-0751		Hex Bolt 1/4-20 x .62" Lg.
48	720-0223		Grip				(Gr. 5)
49	732-0580		Spring Lever	100	711-0805		Shld. Pin 3/8-24 x 1.43" Lg.
50	732-0578A		Torsion Spring—R.H.	101	16855		Pawl Plate
51	732-0577A		Torsion Spring—L.H.	102	17053A		Chain Cover Ass'y.
52	750-0566		Spacer .255" I.D.	103	741-0324		Hex Flange Brg. .506" I.D.
53	12297A	N	Handle Brkt. Ass'y.—L.H.	104	736-0160		Fl-Wash. .531" I.D. x .93"
54	747-0698B		Hinge Pin 17.75" Lg.	105	738-0719A		Rear Axle Ass'y.
55	726-0106		Cap Speed Nut	106	741-0522		Hex Flange Bearing
56	711-0805		Shld. Pin 3/8-24 x 1.43" Lg.	107	17009		Chain Axle Ass'y.
57	736-0169		L-Wash. 3/8" I.D.*	108	736-0498 0160		Internal L-Wash. 1/4" I.D. 531 X .300
58	712-0711		Hex Jam Nut 3/8-24 Thd.	109	748-0190 711-0313		Spacer .50" I.D. 536 X .610 00 X .88
59	712-0296		Hex L-Nut 3/8-24 Thd.	110	732-0481		Extension Spring 3.8" Lg.
60	736-0105		Bell-Wash. .38" I.D. x .88"	111	750-0589		Spacer .325" I.D.
61	710-0778		Hex Wash. Hd. Tap Scr.	112	754-0346		V-Belt
			1/4-20 x 1.5" Lg.	113	720-0224		Grass Catcher Locking Knob

Models 476E and 478E

PARTS LIST FOR MODELS 476E AND 478E ROTARY MOWERS (CONTINUED)

REF. NO.	PART NO.	CODE	DESCRIPTION	REF. NO.	PART NO.	CODE	DESCRIPTION
114	714-0104	N	Internal Cotter Pin 5/16" Dia.	132	725-0727	N	Battery Charger
115	713-0353		#48 Chain .50" Pitch x 30 Links	133	725-1206		Plug
116	717-0417B		Transmission Comp.	134	725-1442		Wire Harness
			(See Breakdown)	135	725-1276		12 Volt Battery
117	710-0892	N	Hex L-Wash. H.D. AB-Tap Scr. 1/4 x .62" Lg.	136	731-0891A	N	Upper Battery Tray
120	736-0242		Bell-Wash. .345" I.D. x .38"	137	725-0873		Key Switch
130	16542B		Lower Battery Tray	138	725-0201		Key
131	710-0969		Hex AB-Tap Scr. 1.0" Lg.	139	725-1428		Fuse Holder
				140	725-1538		Ext. Harness

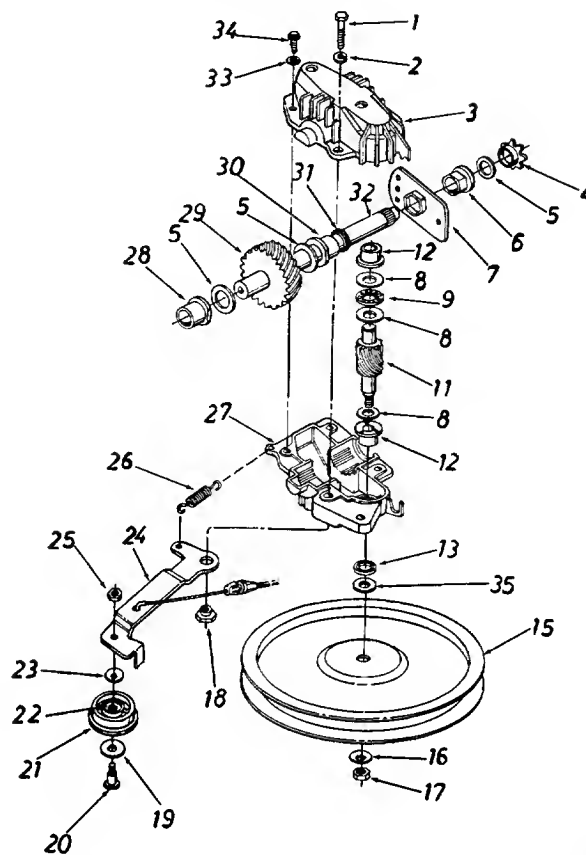
Models 476E and 478E



PARTS LIST FOR MODELS 476E AND 478E ROTARY MOWERS

REF. NO.	PART NO.	CODE	DESCRIPTION	REF. NO.	PART NO.	CODE	DESCRIPTION
1	710-1017		Torx Mach. AB-Tap Scr. 1/4 x .62" Lg.	9	710-0352		Hex L-Wash. Hd. AB-Tap Scr. 1/4 x .38" Lg.
2	721-0216		Height Adjustment Support	10	732-0589		Extension Spring 2.39" Lg.
3	17323		Height Adjustment Plate	11	736-0105		Bell-Wash. .380" I.D. x .88" O.D.
4	736-0329		L-Wash. 1/4" I.D.*	13	731-0981A		Hub Cap
6	747-0699		Height Adj. Connecting Rod	14	734-1512A		Wheel Ass'y. Comp.—Front
7	714-0507		Cotter Pin 3/32" Dia.	15	738-0102		Shld. Bolt .498" Dia. x 1.45"
8	17022		Front Axle Ass'y.				

Models 476E and 478E



PARTS LIST FOR MODELS 476E THRU 478E ROTARY MOWERS

REF. NO.	PART NO.	CODE	DESCRIPTION	REF. NO.	PART NO.	CODE	DESCRIPTION
1	710-1062		Hex Bolt 1/4-20 x 1.25" Lg. w/Patch	19	736-0344		Fl-Wash. .390" I.D. x 1.0"†
2	736-0329		L-Wash. 1/4" I.D.*	20	738-0826		Shld. Bolt .375" Dia. x .40"†
3	717-0418A		Upper Hsg. Half	21	756-0558		Fl-Idler Plastic 1.50" Dia.†
4	713-0400		#48 Sprocket 7 Tooth x 1/2 Pitch	22	741-0556		Needle Brg. .375" x .31†
5	736-0336		Fl-Wash. 5/8" I.D. x .030	23	736-0270		Bell-Wash. .265" I.D. x .75"†
6	741-0413		Hex Flange Brg. .631" I.D.	24	17052A		Idler Brk't. Ass'y.†
7	16500A		Hex Bearing Cup	25	712-0138		Hex Patch L-Nut 1/4-28 Thd.†
8	736-0314		Thrust Wash. .382" I.D. x .70" O.D.	26	732-0357		Extension Spring 1.12" Lg.†
9	741-0479		Thrust Bearing .375" I.D. x .812" O.D.	27	717-0419A		Lower Hsg. Half
11	717-1216	N	11 Tooth Pinion Shaft	28	741-0415		Flange Bearing .566 Dia.
12	748-0208A		Flange Bearing	29	717-0422		33 Tooth Helical Gear
13	721-0212		Oil Seal	30	741-0414		Flange Bearing .629 Dia.
15	756-0330A		Fl-Pulley 5.06" O.D.†	31	721-0213		Oil Seal .625 Dia.
16	736-0270		Bell-Wash. .265" I.D. x .75"†	32	738-0607		Gear Sprocket Shaft
17	712-0351		Hex L-Nut 1/4-28 L.H. Thd.†	33	736-0722		L-Wash. #10 I.D.
18	738-0440		Shld. Spacer .375" Dia. x .170†	34	710-0436		Hex B-Tap Scr. #10 x .62"
				35	736-0410		Hex Washer .26" x .88"†
				—	717-0417B		Transmission Comp.

†Not Part of Transmission Complete

*For faster service obtain standard nuts, bolts and washers locally. If these items cannot be obtained locally, order by part number and size as shown on parts list.

TROUBLE SHOOTING GUIDE

Trouble	Possible Cause(s)	Corrective Action
Engine fails to start	<ol style="list-style-type: none"> 1. Blade control handle disengaged. 2. Spark plug wire disconnected. 3. Throttle control lever not in CHOKE position. 4. Fuel shut-off valve closed. (If so equipped) 5. Discharged battery. 6. Fuel tank empty, or stale fuel. 7. Blocked fuel line. 8. Faulty spark plug. 9. Engine flooded. 	<ol style="list-style-type: none"> 1. Engage blade control handle. 2. Connect wire to spark plug. 3. Move throttle lever to CHOKE position. 4. Open fuel shut-off valve.† 5. Charge battery or use auxiliary recoil starter as instructed in Operation section. 6. Fill tank with clean, fresh gasoline. 7. Clean fuel line. 8. Clean, adjust gap or replace. 9. Remove spark plug, dry the plug, and crank engine with plug removed and throttle in off position. Replace spark plug, connect wire and resume starting procedures.
Engine runs erratic	<ol style="list-style-type: none"> 1. Unit running in CHOKE position. 2. Spark plug wire loose. 3. Blocked fuel line or stale fuel. 4. Vent in gas cap plugged. 5. Water or dirt in fuel system. 6. Dirty air cleaner. 7. Carburetor out of adjustment. 	<ol style="list-style-type: none"> 1. Move throttle lever to FAST position. 2. Connect and tighten spark plug wire. 3. Clean fuel line; fill tank with clean, fresh gasoline. 4. Clear vent. 5. Drain fuel tank. Refill with fresh fuel. 6. Clean air cleaner.† 7. Adjust carburetor.†
Engine overheats	<ol style="list-style-type: none"> 1. Engine oil level low. 2. Air flow restricted. 3. Carburetor not adjusted properly. 	<ol style="list-style-type: none"> 1. Fill crankcase with proper oil. 2. Remove blower housing and clean.† 3. Adjust carburetor.†
Occasional skip (hesitates) at high speed	<ol style="list-style-type: none"> 1. Carburetor idle speed too slow. 2. Spark plug gap too close. 3. Carburetor idle mixture adjustment improperly set. 	<ol style="list-style-type: none"> 1. Adjust carburetor.† 2. Adjust gap to .030". 3. Adjust carburetor.†
Idles poorly	<ol style="list-style-type: none"> 1. Spark plug fouled, faulty or gap too wide. 2. Carburetor improperly adjusted. 3. Dirty air cleaner. 	<ol style="list-style-type: none"> 1. Reset gap to .030" or replace spark plug. 2. Adjust carburetor.† 3. Clean air cleaner.†
Excessive vibration	<ol style="list-style-type: none"> 1. Cutting blade loose or unbalanced. 2. Bent cutting blade. 	<ol style="list-style-type: none"> 1. Tighten blade and adapter. Balance blade. 2. Replace blade.
Mower will not discharge grass	<ol style="list-style-type: none"> 1. Engine speed too low. 2. Wet grass. 3. Excessively high grass. 	<ol style="list-style-type: none"> 1. Set throttle between 3/4 and full throttle. 2. Do not mow when grass is wet; wait until later to cut. 3. Mow once at a high cutting height, then mow again at desired height or make a narrower cutting swath (1/2 width).
Uneven cut	Dull blade.	Sharpen or replace blade.

†Refer to separate engine manual packed with your unit.

Note: For repairs beyond the minor adjustments listed above, contact your local authorized service dealer.

REPLACEMENT PARTS • P.O. BOX 360900 • CLEVELAND, OHIO 44136